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# INSTITUTE OF GAS TECHNOLOGY

THE GAS INDUSTRY'S OWN EDUCATIONAL AND RESEARCH FACILITY

CHICAGO 16, ILLINOIS

# GAS ABSTRACTS

VOLUME 9, NUMBER 1

JANUARY, 1953

AFFILIATED WITH

ILLINOIS INSTITUTE OF TECHNOLOGY

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GAS ABSTRACTS is published and distributed monthly by the Institute of Gas Technology, Chicago 16, Illinois. The contents of selected papers and patents are reviewed impartially by the editorial staff and material of potential interest to the Gas Industry is presented. Subscription rates to non-members of the Institute: $18.00 per year to U.S. addresses; $22.00 foreign.—Printed in the U.S.A.


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# 1. GAS INDUSTRY

## Appliance Sales

Smith, F. C. WHAT PRICE SALESMANSHIP. *Am. Gas. Assoc. Monthly*, 34, 6-8, 39 (1952) November.

The author, a great exponent of aggressive appliance selling, feels that the gas industry swamped with many problems has not sold the number of appliances necessary for leadership. The gradual gains of electric appliances are traced. The utility and the appliance manufacturer must work together vigorously to restore the sales of gas equipment to its proper level.

J. D. Parent

## Canadian Gas

Dougherty, J. F., Folger, A., Lowe, H. R., Meyer, J., Trostel, E. G. NATURAL GAS IN THE PROVINCE OF ALBERTA, CANADA. *J. Petroleum Techn.*, 4, 241-260 (1952) October.

The geology and production history of the province is traced in great detail. Estimated reserves as of January 1, 1952 were 11.7 trillion CF. It is suggested that an equal quantity will be discovered in the decade following provision of an adequate market. J. D. Parent

Ralph, H. D. MORE GAS FROM ALBERTA. *Oil Gas J.*, 51, 70-72 (1952)) November 24.

The somewhat confusing situation existing in regard to the export of gas from the province of Alberta both to the rest of Canada and to the United States is reviewed. The Pacific Coast region is now virtually assured of gas service from the Peace River area. By spring the province may permit additional exports. Speculation points to a new line running to the east.

O. T. Bloomer

## Cost Allocations

Shomaker, L. IS FPC GAS COST ALLOCATION EQUITABLE? *Public Utilities Forin.*, 50, 680, 688 (1952) October.

In the allocation of costs which are partially fixed and partially variable, the FPC has, in four recent cases, taken little consideration of the percentages which are actually fixed and variable, respectively, but has used its "informed judgment" or "equity" as a substitute for facts and arbitrarily made about a 50-50 division of the total costs. FPC decisions continue unfavorable to interruptible customers, and this large industrial load is becoming less and less competitive to other fuels.

A. E. Neumann

## Middle East to Europe Gas

Duff, D. M. HUGE LINE PROPOSED. *Oil Gas J.*, 51, 80-83 (1952) November 3.

The possibility of using natural gas from the Middle East by construction of a 2,500 mile pipe line to Western Europe has been made known by S. D. Bechtel. Political obstacles, however, seem virtually insurmountable. J. D. Parent

## Fuel Markets

Richmond, K. C. HEATING AND FUEL REQUIREMENTS IN THE NATIONS'S SCHOOLS. *Coal Heat*, 6, 1-26 (1952) October.

These short articles give statistical surveys of varying scope on fuel requirements of schools. Costs, new construction, performance criteria, fuel consumption variation, control and firing methods, improvement of practice are discussed.

O. P. Brysch

Richmond, K. C. HEATING AND FUEL MARKETS: GOVERNMENTAL BUILDINGS. *Coal-Heat*, 6, 36-40 (1952) November.

A local survey over more than 100 buildings in the Chicago area, and a breakdown of Census data for states shows a very large market for coal. Townships, municipalities, special districts and counties total 48,964 units, while local school districts make up 70,452 more, most of which maintain and heat buildings or plants. These and the federal buildings (perhaps several hundred thousand) require large amounts of coal, estimated at 12 million tons per year, which market may be largely supplied by energetic retail coal dealers. O. P. Brysch

## Gas Industry Training

Parent, J. D. TRAINING MEN FOR THE GAS INDUSTRY. *Public Utilities Fortn.*, 50, 696-704 (1952) November 6.

A major activity of the Institute of Gas Technology is the training of men for the gas industry. There are 3 phases: the training of carefully selected graduates of accredited colleges at the graduate level in engineering, pure science, economics and gas technology for positions of responsibility in the gas industry; the

home study course; and the summer refresher courses. The first of these programs is on a fellowship basis of full-time study and leads to the MS in engineering or the Master of Gas Technology. It can be extended with additional work leading to the Ph.D. The second program is designed for those unable to attend the Institute; several plans are available. The third program is for gas industry personnel including recent engineering graduates who can be spared for 3 to 12 weeks in the summer. The Institute is planning to offer its basic courses in natural gas, transmission-distribution, combustion-utilization and natural gas substitutes each summer in successive 3-week courses.

J. D. Parent

## Industry Expansion

Davis, R. E. NATURAL GAS IN AN EXPANDING ECONOMY. *Oil Gas J.*, **51**, 394-399 (1952) November 17.

A number of facets of the natural gas industry are discussed, but chiefly the problem of an equitable basis of rate making.

J. D. Parent

## Nationalized Gas

Gas Council, REPORT FOR 1951-1952. *Gas J.*, **272**, 381-382, 386-388 (1952) November 12; *Gas World*, **136**, 1221-1239 (1952) November 15; *Gas Times*, **73**, 238, 240-244 (1952) November.

The third report of the British Gas Council and Area Boards, for the year ending March 31, 1952 is reviewed. The gross income of the nationalized industry was 261 million pounds, of which 147.6 million was from gas sales and the remainder from by-products, appliances, and rentals; — all showing an increase over the 1951 report. Two of the 12 boards showed a deficit, but the total surplus was 1.44 million pounds which raised the 3-year surplus to 3.4 million pounds. Total gas sold was 2,513 million therms (an increase of 2%) at an average of 14.09 d/therm. Scrapped plant capacity amounting to 150 M therms/day has been replaced by new plant capacity of 694 M therms/day, a 5.5% increase to 11 million therms of 2,300 million CF/day. 137,555 pounds was spent on research by the Council alone.

O. P. Brysch

## Northern Natural Decision

Badger, R. E. IMPACT OF THE NORTHERN NATURAL GAS DECISION ON FINANCING. *Public Utilities Fortn.*, **50**, 751-760, (1952) November 20.

The FPC decision in the Northern Natural Gas case has caused concern in the industry over investments in natural securities. The article presents an account of the effect of this decision on investment in these companies.

J. D. Parent

Ralph, H. D. NORTHERN NATURAL'S GROWING PAINS. *Oil Gas J.*, **51**, 69, 172, 181 (1952) November 3.

The problems confronting the Northern Natural Gas Company in its attempt to expand its system to supply increased consumer demand for gas are discussed. Most of the problems are those involved in meeting the F.P.C. requirements.

O. T. Bloomer

## Pipe Line Authorizations

QUARTER BILLION-DOLLAR PLANS. *Petroleum Eng.*, **24**, D-48 (1952) October.

For the first six months of 1952, the Federal Power Commission has authorized construction of 1915 miles of pipelines and 351,960 compressor horsepower. The names of the firms (who have received the permission), the description of the construction and estimated costs are tabulated.

D. C. Gami

## Public Relations

Hassett, J. J. A PUBLIC RELATIONS PROGRAM FOR THE GAS UTILITIES? *Public Utilities Fortn.*, **50**, 715-721 (1952) October.

The gas industry has not kept pace with the electric and other fuel industries in public relations activities. The author points out the need for local as well as national public relations programs, and suggests subjects on which the public should be better informed.

A. E. Neumann

## Utility Regulation

Paton, W. A. SHOULD THE SEC CONTINUE TO "STUDY" UTILITY SYSTEM OPERATIONS? *Public Utilities Fortn.*, **50**, 473-480 (1952) October 9.

Commenting on Paragraph 30 of the Holding Company Act, the author states that railways

and other public utilities have been subjected to more or less complete price regulation and operating control by governmental agencies without becoming actually nationalized. He feels that the pendulum has swung dangerously far in this direction and that utilities face an unfavorable tax structure, direct government competition and a rigid and unrealistic regulatory framework. Creation of a feeling of friendship in place of increased direction and dictation is proposed. In reply, Chairman Cook of SEC agrees that incentives to good management should be provided by regulatory bodies, but felt that Paragraph 30 of the Holding Company Act does not necessitate decline of vigor in utility management and that considerable good can result. (See also *Gas Abs* 8, 206 (1952) November). J. D. Parent

## 2. APPLIANCES

### Burner

Chambers, J. E. (assigned to Chambers Corp.) TOP BURNER FOR GAS RANGES. U. S. 2,614,620 (1952) October 21.

A range-top chimney burner with improved ignition is described. E. F. Searight

Fuller, R. A. (assigned to Selas Corp. of America) BURNER AND NOZZLE TIP FOR PROJECTING HOT PRODUCTS OF COMBUSTION. U. S. 2,614,619 (1952) October 21.
A high temperature gas burner and nozzle tip for producing hot products of combustion is described. E. F. Searight

### Heat Pump

Stoecker, W. F. and Herrick, R. R. HEATING AND COOLING A RESIDENCE WITH A 3-H.P. AIR SOURCE HEAT PUMP. *Refrigerating Eng.*, 60, 1172-1176 (1952) November.

Results of a fifteen-month test on the performance of a 3-hp. air-source heat pump in a small occupied house are reported in considerable detail from the University of Illinois. Acceptable performance for both the heating and cooling season was indicated provided that supplementary heat was employed during low (below 30° F.) outdoor temperatures. The average coefficient of performance in the heating season was 2.2. O. T. Bloomer

### Heating Equipment

Wolpert, N. N. GAS-FIRED HEATING EQUIPMENT. *Heating and Ventilating*, 49, 88-91 (1952) October.

Gas-fired heating equipment introduced during the past five years is reviewed. Some units are described to show general design trends and functions. R. A. Brown

### Space Heating

Hartley, H. DOMESTIC SPACE HEATING AND THE NATIONAL ECONOMY. *Gas J.* (British), 271, 637-644 (1952) September 17.

This article discusses the house heating problem in England. It points out the need for efficient use of the available coal supply in order that sufficient fuel will be available for producing manufactured goods for export.
E. F. Searight

## 3. COMBUSTION AND INDUSTRIAL FURNACES

### Coal-Gas Turbine

Robinson, W. and Landry, B. A. (assigned to Allis- Chalmers Mfg. Co.) METHOD OF PRODUCING A GASEOUS MOTIVE FLUID WITH PULVERIZED FUEL. U. S. 2,616,252 (1952) November 4.

The patent relates to a method for the combustion of pulverized coal above the ash fusion temperature so that the ash particles become spheroidal in shape and thus minimize gas turbine blade errosion. E. J. Pyrcioch

### Gas-Fired Boiler

Mumford, A. R. and Corey, R. C. VARIATION IN HEAT ABSORPTION IN A NATURAL-GAS-FIRED, WATER-COOLED STEAM-BOILER FURNACE. *Trans. Am. Soc. Mech. Eng.*, 74, 1191-1215 (1952) October.

A study of the distribution of heat absorption in a natural-gas-fired, water-cooled steam-boiler furnace is covered. A mixing-vane setting for high capacity was used on all test loads. A similar isotherm pattern for the furnace walls was obtained at all loads, the gradient varying with rating. This constant isotherm pattern indicates that for a given burner and mixing set-

ting, the path of the gases through a furnace is determined by the burner position and geometry of the furnace and not significantly by rating or excess air. About 80 per cent of the heat absorbed by the furnace was transferred by radiation according to computations. Estimates of heat release indicated values of 160,000 Btu/cu.ft. of combustion space. The authors conclude that natural gas can be burned rapidly and completely at high-release rates provided that sufficient hot-air pressure and a well-designed mixing burner are used.

E. J. Pyrcioch

### Heat Recovery

Uhl, W. C. DON'T LET HEAT GO UP YOUR FLUE. *Petroleum Processing*, 7, 1444-1446 (1952) October.

Installations and possible fuel savings are reported for the Houdry platinum-alloy oxidation catalyst to convert CO to $CO_2$.

H. A. Dirksen

### Methane Ignition

Broatch, J. D. and Egerton, A. C. A NOTE ON THE IGNITION OF METHANE AT HIGH PRESSURES. *Fuel* (British) 31, 494-496 (1952) October.

The ignition of methane at high pressure was investigated in a study of knocking combustion.

E. F. Searight

### Thermopile Generator

Emmerson, R. J. PRODUCES ELECTRICITY FROM A GAS FLAME. *World Oil*, 135, 310-313 (1952) October.

The use of a thermopile generator to produce electricity for corrosion protection of pipelines is discussed.

E. F. Searight

## 4. CARBONIZATION AND GASIFICATION

### Carbonizing Processes

Matheson, G. L. (assigned to Standard Oil Development Co.) CARBONIZING SUBDIVIDED SOLIDS. U. S. 2,614,069 (1952) October 14.

The patent relates to a method for carbonizing coal or other carbonaceous particles employing a fluidized bed reactor with provision for maintaining a desirable particle-size distribution within the fluidized bed.

E. J. Pyrcioch

Poindexter, F. E. and Lowe, F. W. HORIZONTAL RETORT WITH RECIPROCATING AGITATOR. U. S. 2,615,834 (1952) October 28.

A retort for charring coal is claimed, in which the coal is spread continuously on a gas-heated flat metal plate and is stirred and moved horizontally by rapidly reciprocating scrapers. Volatiles are collected through a housing and condensed.

O. P. Brysch

### Coal Research

Brocke, E. THE SIGNIFICANCE OF COAL BED STUDIES IN THE PREPARATION OF COALS. (DIE BEDEUTUNG DER FLOEZUNTERSUCHUNGEN FUER DIE KOHLENAUFBEREITUNG. *Brennstoff-Chemie* (German), 33, 329-338 (1952) October 15.

Data is given on a number of German coal beds, of which complete columnar sections were measured and analyzed. Petrographic constituents and associated mineral matter at various points of the section are compared. Sink-and-float results and their application to washery practice, are given, to show how all the seams of a given mine may be utilized to produce the desired uniformity of properties in the washed products.

O. P. Brysch

Brown, R. L. and Carman, E. P. ANNUAL REPORT OF RESEARCH AND TECHNOLOGIC WORK ON COAL, FISCAL YEAR 1951. U. S. Bureau of Mines Inf. Circ. 7647 (1952) October.

The intensified 1951 program of study of fuel resources and future supply is reviewed. New Laboratories at Grand Forks, N. Dak. and additions at Schuylkill Haven, Pa. are described. Coal mining techniques, equipment and safety are briefly outlined. The survey of coking coal reserves, coal preparation and carbonizing properties is described in some detail. Combustion of coal and industrial problems of coal storage and boiler water are reported. Gasification processes, such as the Lurgi, the lignite annular retort, and the Gorgas underground installation are reviewed, but more discussion is devoted to synthesis gas production from the Morgantown, Bruceton, and Lou-

isiana laboratories. Studies of the gas synthesis process, iron catalysts, and the oil-circulation, slurry-phase and fixed- and fluidized-bed conditions as well the coal hydrogenation catalysts, pilot plants and products are noted, together with progress in the demonstration plants. O. P. Brysch

Newman, P. C. and Whelan, P. F. SEPARATION OF HARD AND BRIGHT COAL MINED FROM A SINGLE SEAM, BY PHOTOELECTRIC COMPARISON OF THE DIFFERENCES BETWEEN SPECULAR AND DIFFUSE REFLECTIONS FROM EACH LUMP. *Fuel* (British) **31**, 481-493 (1952) October.

An optical sorting machine has been developed for separating bright and dull coal. Two types of optical system with associated electronic equipment were developed in the laboratory and eventually tested on a pilot plant. The results show that optical sorting is possible in the case of these two coals with an efficiency of the order of 80 per cent (in so far as a single figure can denote efficiency in such a machine) at the very small cost of less than 3d per ton. A greater efficiency at a somewhat higher cost can be obtained by re-treating one of the primary products. Authors' Abstract

## Gas Purification

Wainwright, H. W., Egleson, G. C., Brock, C. M., Fisher, J. and Sands, A. E. REMOVAL OF HYDROGEN SULFIDE AND CARBON DIOXIDE FROM SYNTHESIS GAS USING DI- AND TRI-ETHANOLAMINE. U. S. Bureau Mines Rept. of Invest. 4891 (1952) October.

Pilot plant studies at Morgantown on removal of hydrogen sulfide and carbon dioxide from synthesis gas are described. Emphasis was on operation at 300 psig pressure. Aqueous solutions of TEA of 20, 30, 35, and 50% were investigated. The optimum concentration is 30 to 35% if both selectivity for $H_2S$ and economy are considered. Better selectivity is obtained with the 20% solution, but steam consumption is greater. A 50% solution not only produces an acid gas of lower hydrogen sulfide content but also requires high solution rates to effect hydrogen sulfide removal. In cooperation with the Southern Natural Gas Co., investigations were carried out at 300 psig on the simultaneous removal of hydrogen sulfide and carbon dioxide from gases using various concentrations. of diethanolamine. A comparison of one DEA run at 200 psig with the runs at 300 psig shows that the absorption capacity of the solution, and, hence, the steam requirements per gallon are about the same for both pressures. The only real advantage of the higher pressure is the additional volume of gas that can be treated. The quantity of steam needed to reactivate fouled TEA and DEA solutions increased as the reactivator pressure was increased. About 1.0 to 1.1 lb.steam/gallon of circulating solution was required when the reactivator was operated at 5 psig. One run in which 35 percent TEA was used and the absorber was operated at atmospheric pressure rather than 300 psig showed that about 5.5 times as much steam for reactivation is required at the lower absorber pressure to purify one MCF raw gas. Both TEA and DEA reduced the organic sulfur content of the raw synthesis gas considerably. Analyses of the lean amine solutions showed a gradual build-up of sulfur compounds, indicating that the compounds formed by the amines and organic sulfur do not break down under the ordinary operating conditions of the reactivator. Considerable operating difficulty was encountered owing to foaming of the amine solutions. Laboratory experiments in which the effectiveness of certain antifoam agents was studied showed Alkaterge C to be most promising. A brief description of the analytical methods is included. Authors' Abstract

## High-Btu Oil Gas

Tate, W. E. CONVERSION OF GREENPOINT TO A HIGH-BTU GAS PLANT. *Gas*, 28, 38-39 (1952) November.

The conversion of five mechanical-grate carbureted water-gas sets to non-regenerative, distillate-oil high-Btu oil gas operation, and of six manually cleaned carbureted water-gas sets to six Hall high-Btu oil gas sets is described. In the conversion to the Hall sets the old 11-ft. diam. dust catcher was used as the nucleus of the second oil gas generator. The expected total capacity of the non-regenerative sets is 37 MMCF/day of 1040 Btu/SCF gas and of the Hall sets is 30 MMCF/day of 1040 Btu/SCF gas. H. R. Linden

### Hydrocarbon Gasification

Morgan, J. J. GASIFICATION OF HYDROCARBONS FOR PRODUCTION OF GASES TO SUPPLEMENT NATURAL GAS IN CITY SUPPLIES. CHAPTER VIII. AUTOCALORIC OR PARTIAL COMBUSTION CRACKING IN GAS MAKING. (PART I). *Gas Age*, 110, 82-86, October 23; (Part II) 110, 37-40 (1952) November 6.

The series on the commercial developments in gasification of hydrocarbons is continued. The entire series is expected to appear as a book in 1953. O. P. Brysch

### Organic S Removal

Barr, F. T. (assigned to Standard Oil Development Co.) PRODUCTION OF SULFUR FREE WATER GAS. U. S. 2,614,038 (1952) October 14.

With production of water gas or synthesis gas, in either fixed bed or fluid bed, the amount of organic sulfur in the gas may be reduced by carrying out the gasification at temperatures above 1000° F. in the presence of a catalyst promoting the cracking of organic sulfur compounds. Reformation of such compounds by reaction of $H_2S$ with CO is prevented by rapidly chilling the gas after leaving the combustion zone to a temperature of 400-600° F., by passage through a steam preheater and cooler, or by quenching with a liquid spray. In an example it is indicated that the organic sulfur is reduced from 4-8% of the total sulfur in the gas to 0.04-0.08%, as a result of adding 1% by weight of bauxite to the coal charge. D. M. Mason

### Oven-Top Temperatures

Haarmann, A. THE TEMPERATURE OF THE COKE OVEN GAS-COLLECTING SPACE AND ITS REGULATION THROUGH TEMPERATURE INDICATORS. (DIE TEMPERATUR DES GASSAMMELRAUMES AND IHRE REGELUNG DURCH DIE TEMPERATUR-WARNANLAGE.) *Brennstoff-Chemie* (German), 33, 321-327 (1952) October 15.

The overheating of the oven gas-collecting space which destroys valuable aromatic products, and its under-heating which gives undesirable fractions in the aromatic products, can be held to a minimum by available adjusting means if the temperature of the top space is known. Thermometric installations, and the favorable results attending temperature regulation in industrial coke ovens are described.

O. P. Brysch

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

De Mey, C. F. STUDY SYNTHETIC NATURAL GAS. p. 9

Hutchinson, A. J. SELECTIVE SEPARATION OF ACIDIC GASES. p. 8

Randlett, H. E. PURIFICATION AND SEPARATION OF GASEOUS MIXTURES. p. 7

## 5. NATURAL GAS AND NATURAL GAS CONDENSATES

### Biggest Sendout

Love, F. H. TRILLION CUBIC FOOT GAS SYSTEM. *Petroleum Eng.*, 24, D9-D22 (1952) November.

This is a very detailed and profusely illustrated account of new facilities of United Gas Corporation. The $200,000,000 program expands the system's capacity from 3 billion to 4 billion CF/day and makes it the first able to handle a trillion CF/year. J. D. Parent

### Communications

Lester, C. B. MICROWAVES FOR PIPELINERS. PART I — A MICROWAVE PRIMER. *Pipe Line News*, 24, 46-53 (1952) November.

This begins a seven-part series on "Microwaves for Pipeliners". Part I, somewhat misnamed, is primarily a brief history of the development of microwave systems from Clerk-Maxwell to recent installations on long distance transmission lines. O. T. Bloomer

### Dehydration Plants

Campbell, J. M. and Laurence, L. L. DEHYDRATION OF NATURAL GAS AND HYDROCARBON LIQUIDS. *Petroleum Refiner*, 31, 109-116 (1952) November.

The third of a series on dehydration of natural gas or hydrocarbon liquids. Various desiccants are discussed. Physical properties of di- and

tri-ethylene glycols are given. Operation, design, process and economic factors for a dehydration plant using tri-ethylene glycol are discussed. Using this process, plants processing more than 50 MMCF and working at 1000 psig will have an estimated initial cost of $500/million CF of gas treated. The operating cost will average about $0.40/million SCF. See *Gas Abstracts* 8, 212, (1952) November.

D. C. Gami

## Distribution Problems

Brown, K. E. DISTRIBUTION PROBLEMS OF AN EXPANDING LOAD. *Gas World* (British), **136**, 1104-1107 (1952) November 1; *Gas Times* (British), **73**, (1952) October 31, Suppl. Tech. Publ. 22, 7 pp.

The problems arising with the doubling of gas load in the Newcastle area (400 sq. mi.) to 17,000 MMCF/year are discussed. Special attention is given to metering, since the majority of meters operating under higher distribution pressures have been found "slow". Research on meter leathers is promising. The progress on a high-pressure "ring" (17-in. W.G.) is well advanced, and much of a ring and grid intermediate-pressure system at 14-in. W.G. is completed. Recording instruments are in use at 70 governor stations, but radio-equipped vans are used for patrol and emergency adjustment of pressures.

O. P. Brysch

Hayes, S. W. FLEXIBLE JOINTS FOR MAIN AND SERVICE LAYING. *Gas World* (British), **136**, 1109-1112 (1952) November 1; *Gas Times* (British), **73**, 156-157 (1952) October 31.

A brief description is given (with drawings) of a number of patented flexible joints for spun-iron gas mains. These have displaced lead joints and come into widespread use since the war. Principles, advantages, protection against vibration and corrosion, and provisions for expansion are outlined. Asbestos-cement mains and their joints and service saddles are briefly treated, as are flexible-joint service connections.

O. P. Brysch

Steger S. J. DISPATCHING AND TELEMETERING IN A DISTRIBUTION SYSTEM. *Gas*, **28**, 35-37 (1952) November.

Establishment of a 24-hour gas dispatching department and complete telemetering and remote control of pressure regulators in the Memphis distribution system is described. This was found to be necessary as a remedy to the increasing customer complaints due to inadequate methods of pressure control in a rapidly expanding system.

R. A. Brown

## Distribution Safety

WISCONSIN P.S.C. ISSUES INTERIM RULES FOR GAS DISTRIBUTION SAFETY. *Gas Age*, **110**, 69, 132-134 (1952) October 23.

These adoptions stress leak detection programs, paving procedures, checks on migrant gas, records of repairs, regular inspections, changes in high pressure constructions, corrosion control and odorization of gas.

R. A. Brown

## Exploration

Segesman, F. F. ROLE OF ELECTRONICS IN GEOPHYSICAL INSTRUMENTATION. *Oil Gas J.*, **51**, 152-160 (1952) October 20.

This article deals with the instrumentation aspects of exploration geophysics with special emphasis on the requirements for subsurface instrumentation and equipment used in the geophysical exploration of bore holes.

R. A. Brown

## Gas Conditioning

Brown, L. N., and Phillips, J. M. SOUTHERN NATURAL REMOVES DISTILLATE AND INCREASES PIPE-LINE EFFICIENCY. *Oil Gas J.*, **51**, 88, 114, 115 (1952) November 3.

Southern Natural Gas was confronted with the problem of decreased line efficiency in an 18″ and 16″ 1200 psia transmission system. Because of retrograde condensation distillate was dropping out in the line as the pressure in the line decreased. A distillation reduction plant was then installed. This plant is unique in that absorption oil is injected into the field lines as a means of avoiding the expense of conventional absorption equipment. Rich oil separated from the gas is stripped in a still and is recirculated. The value of the condensate is paying for the operation of the plant.

O. T. Bloomer

## $H_2S$ Removal

Randlett, H. E. (assigned to Shell Development Co.) PURIFICATION AND SEPARATION OF GASEOUS MIXTURES. U. S. 2,615,787 (1952) October 28.

Hydrogen sulfide and other acidic components of gases are removed by an aqueous solution of

potassium phosphate. Improved modes of operation to effect economical operation include concentrating the used alkaline reagent prior to steam stripping, and stripping acidic compounds from condensate with steam from the regenerating section. C. E. Hummel

SULPHUR FROM $H_2S$. *Chem. Eng.*, 59, 210-215 (1952) October.

A flow diagram and photographs of component parts of the plant are featured in this presentation of Freeport Sulfur Company's sulfur recovery plant. Waste hydrogen sulfide is used as raw material for this process employing a modification of the Claus method. Up to 95 percent hydrogen sulfide is recovered as sulfur. C. E. Hummel

## $H_2S$-$CO_2$ Separation

Hutchinson, A. J. (assigned to Fish Engineering Corp.) PROCESS FOR SELECTIVE SEPARATION OF ACIDIC GASES. U. S. 2,613,132 (1952) October 7.

Acid gas, removed from gaseous mixtures by amine solutions, is separated into its carbon dioxide and hydrogen sulfide fractions by passing carbon dioxide through the absorbent to displace the hydrogen sulfide. This hydrogen sulfide is washed with regenerated absorbent to remove carbon dioxide, and the carbon dioxide is stripped from the solution in another tower. C. E. Hummel

Royer, L. W. (assigned to Koppers Co., Inc.) GAS SEPARATION. U. S. 2,614,904 (1952) October 21.

In order to separate hydrogen sulfide and carbon dioxide, these gases are first absorbed in a liquid medium such as diethylbenzene, aniline or kerosine. In the second stage hydrogen sulfide, which is much more soluble in the absorbent, is used to displace carbon dioxide from the solution. Hydrogen sulfide of over 98 percent purity is then stripped from the saturated liquid absorbent. C. E. Hummel

## LP Transport

Casper, J. C. L.P.G.'S BIGGEST PROBLEM. *Oil Gas J.*, 51, 78-80 (1952) November 10.

If the use of LP-gas is to continue to increase cheaper transportation is essential, as production costs will be difficult to cut. Several possibilities of lower transportation costs are discussed. One of the most promising is the use of pipelines at high load factor with underground storage at terminal points. O. T. Bloomer

## Natural Gasoline

Parekh, R. H. PROCESS DESIGN AND OPERATION OF MULTICOMPONENT HYDROCARBON STRIPPING. *Petroleum Refiner*, 31, 99-103 (1952) November.

The results of some theoretical calculations show that the following factors affect the process design and operation of the rich-oil stripping and rectification system of a natural gasoline absorption plant: (1) the effect of the extent of stripping on the recovery of various components; (2) the effect of the presence of solute on the absorption of hydrocarbons in an absorber; (3) the effect of the stripper temperature on the design of the stripping system; (4) the effect of stripping steam rate on the design of the stripping system; (5) the effect of stripper overhead vapor temperature control upon absorption oil contamination, reflux requirement and condenser performance; (6) the effect of rich-oil stabilization with respect to methane and ethane upon the ultimate recovery of propane in the product. Important conclusions are provided. O. T. Bloomer

## Pipe-Line Flow Control

Collerain, J. F. and DeMouche, E. M. PUSH-BUTTON CONTROL OF NATURAL-GAS FLOW. *Oil Gas J.*, 51, 254-258 (1952) October 13.

With the help of time-cycle controllers, pressure transmitters and recorders, and two-way radio, a complete push-button control is established at Houston Pipe Line Co. for dispatching gas throughout its system. D. C. Gami

Lester, C. B. CONTROLS FOR PIPE-LINE ENGINES. *Oil Gas J.*, 51, 212-227 (1952) October 13.

Different types of control necessary for water and lube-oil system, fuel system and safety for pipeline engines are described. D. C. Gami

## Production

Hutchinson, W. M. (assigned to Phillips Petroleum Co.) DRILLING FLUID. U. S. 2,614,979 (1952) October 21.

This invention relates to the use of cellulosic materials as drilling mud additives. Bentonite,

commonly used to hold weighting agents, possesses certain disadvantages so replacement by materials such as carboxymethyl cellulose is suggested. J. D. Parent

### Synthetic Natural Gas

DeMey, C. F. STUDY SYNTHETIC NATURAL GAS. *Am. Gas Assoc. Monthly*, 27, 28 (1952) November: *Oil Gas J.*, 51, 73, 74 (1952) November 3: Paper No. O.S.-52-4, *Am. Gas Assoc.*, New York (1952) October: *Am. Gas J.*, 177, 16, 38, 39 (1952) November: *Gas*, 28, 36-38 (1952) December.

Although present natural-gas reserves indicate a supply for many years to come, the gas industry should maintain continuing studies of developments in the field of coal gasification and gas synthesis against the time when economic supplies of natural gas are no longer available. On the basis of present knowledge, a plant is visualized producing 100 billion Btu, which would require something more than 6,500 tons of coal daily. Water requirements would be about 15,000,000 gal. daily, and the output or generating capacity for synthesis gas, approximately 400,000,000 cu.ft. daily. If coal were delivered at the plant at $4 a ton, the current cost of the final "substitute" gas, obtained by catalytically reacting the synthesis gas, has been variously estimated at between 55 and 65 cents per M.c.f., delivered to the pipe line. The cost of process fuels is between 27 and 32 cents of the total, or about 50 per cent. For each $1 change in the cost of coal, the cost of gas would change about 6 cents.

H. A. Dirksen

### Underground Storage

CAPACITY OF UNDERGROUND STORAGE FIELDS NOW TOTALS ONE TRILLION CUBIC FEET. *Gas Age*, 110, 61-68 (1952) October 23.

A survey reveals 142 fields in use in 18 states. The industrial projects are tabulated. New projects to be presented are also listed. A bibliography on underground storage completes the presentation. J. D. Parent

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Dougherty, J. F. NATURAL GAS IN THE PROVINCE OF ALBERTA, CANADA. p. 1

Wainwright, H. W. REMOVAL OF $H_2S$ AND $CO_2$ FROM SYNTHESIS GAS. p. 5

## 6. PETROLEUM AND SYNTHETIC LIQUID FUELS

### Higher Octane Trend

Weber, G. OCTANE TREND CONTINUES UPWARD. *Oil Gas J.*, 27, 91-94 (1952) November 10.

Continuation of the trend of increased octane ratings is predicted for the next three years at the present level until a 95-96 research octane range is obtained on the east coast by 1954. Estimates represent a combined projection of the ability on the part of the refiner to make the higher octane grade and the probable incentive which may urge them to do so.

H. A. Dirksen

### Hydrogenation Industry

Sherwood, P. W. GERMANY'S HYDROGENATION INDUSTRY TODAY *Petroleum Refiner*, 31, 93-98 (1952) November.

Operations, which account for approximately one-third of the oil refined in western Germany have been converted from coal liquefaction to crude oil processing.

Author's Abstract

### Jet Fuels

Guthrie, V. B. JET FUELS—PRESENT AND FUTURE. *Petroleum Processing*, 7, 1425-1428 (1952) October.

While jet fuels are produced only at the rate of 100,000 B/D at present, in case of maximum production according to JP-4 specification the availability of kerosene, motor gasoline and of diesel oil and other distillate oils would be reduced. No significant reductions in availability of residual and blended heavy fuels are anticipated. H. R. Linden

FUELS FOR JET AIRCRAFT. *Nat. Fire Protection Assoc. Quart.*, 40, 147-148 (1952) October.

Fuels for gas-turbine powered (not "rocket") aircraft are discussed from the standpoint of fire hazards. JP-1, a kerosene type fuel, is relatively safe but is in limited use because of shortages, while JP-3 and JP-4, kerosene-gasoline blends, require as much caution in handling as aviation gasoline. More detailed description is given in NFPA Aviation Bulletin No. 82. O. P. Brysch

## Oil-Waste Disposal

Douce, W. C. and Word, J. A GOOD WASTE-DISPOSAL PROGRAM MAKES SENSE AND PROFITS. *Oil Gas J.*, **51**, 100-104 (1952) September 8.

The various kinds of waste products formed in the operation of a typical small refinery, and possible ways of safely and legally disposing of these waste products are discussed. The most important factor in any waste-disposal program is elimination of unnecessary pollution by efficient maintenance. Pollutants are classified into two main groups: liquid and gaseous. The former is subdivided into oil waste, and chemical and solid-bearing waste. To prevent the formation of stable emulsions which are difficult and costly to separate, the oil and chemical wastes must be collected separately and strictly segregated until ready for final disposal. Oil waste is generally ponded and the oily product removed by gravity and skimming, but heat or chemicals may also be required. Some chemical and solid-bearing wastes, such as phenolate-rich liquors, can be sold and some sludges can be burned. But the easiest manner of disposal is dilution, when such means are legally possible. The elimination of gaseous waste products is chiefly a matter of smoke prevention. Objectionable gaseous waste products, such as hydrogen sulfide and sulfur dioxide, may be recovered for their commercial value. A list of references, including the A.P.I. Manual on Disposal of Refinery Wastes, is given. J. J. Wrozina

## Oil Reserves

Murphee, E. V. WHERE WILL TOMORROW'S OIL COME FROM? *Oil Gas J.*, **51**, 119-124 (1952) November 3.

On the basis of conservative estimates of future demand, proven and anticipated reserves, and the potentialities of secondary recovery and shale oil production, the author states that "granted continuation of reasonable economic incentives and adequate supplies of materials, crude oil and natural gas may be counted upon to be available in abundance for the foreseeable future." H. L. Linden

## Synthesis Processes

Catterall, W. E., and Ohsol, E. O. (assigned to Standard Oil Development Co.) MULTI-STAGE PROCESS FOR CONDENSING HYDROCARBON SYNTHESIS PRODUCTS. U. S. 2,614,115 (1952) October 14.

A multistage process for condensing low molecular-weight neutral oxygenated hydrocarbon products of the hydrogen and carbon monoxide synthesis reaction is claimed.

W. J. Pleticka

Crawford, C. L. (assigned to Gulf Research and Development Co.) APPARATUS FOR PRODUCING SYNTHESIS GAS. U. S. 2,613,145 (1952) October 7.

An apparatus for the production of synthesis gas by partial oxidation of a hydrocarbon (natural gas) at 150 to 650 psi and 1800°F to 2800°F is described. H. A. Dirksen

Keith, P. C., (assigned to M. W. Kellogg Co.) OXIDATION OF HYDROCARBONS. U. S. 2,616,898 (1952) November 4.

The patent relates to improvements in chemical conversion involving the contacting of a reactant (methane) with a contact agent (copper oxide) in a fluidized reactor which produces satisfactory yields of intermediate stage conversion products (formaldehyde).

H. A. Dirksen

Martin, H. Z. (assigned to Standard Oil Development Co.) REMOVAL OF CARBON DIOXIDE FROM HYDROCARBON SYNTHESIS TAIL GAS. U. S. 2,615,909 (1952) October 28.

A system for the removal of carbon dioxide from hydrocarbon synthesis tail-gas and introducing the carbon dioxide into the synthesis gas generator is claimed. W. J. Pleticka

Watson, C. W. (assigned to The Texas Co.) STABILIZATION OF FLUIDIZED IRON SYNTHESIS CATALYST. U. S. 2, 616, 915 (1952) November 4.

The patent claims that by continually taking the fines normally recovered from an iron catalyst in a fluidized synthesis reactor and cementing them with 25% wt. calcium aluminate, a catalyst is eventually produced which is stabilized against further disintegration.

H. A. Dirksen

## 7. ANALYTICAL METHODS AND TESTS

### CO Determination

Katz, M., Riberdy, R., and Grant, G. A. THE OXIDATION OF CARBON MONOXIDE BY SOLID SILVER PERMANGANATE REAGENTS. V. DETERMINATION OF LOW CONCENTRATIONS OF CARBON MONOXIDE BY USE OF THERMISTORS IN A THERMAL CELL. *Can. J. Technology*, 30, 303-310, (1952) October-November.

The temperature rise associated with the oxidation of CO in air by passage over silver permanganate-zinc oxide granules may be measured with a pair of thermistors in a Wheatstone resistance-bridge. Temperature changes corresponding to the oxidation of less than 0.0005% of CO may be detected. Variation of relative humidity between 30 and 85% does not affect the accuracy. D. M. Mason

### Dust Determination

Noss, P. METHODS AND APPARATUS FOR DETERMINING THE DUST CONTENT OF FLOWING GASES. *Engrs. Digest*, 13, 347-350 (1952) October.

Three operations required for dust measurements are discussed—namely sampling the gas, collecting dust from the gas sample, and flow measurement. Several probing units for sampling of the gas are described. Dust collecting apparatus consists essentially of a cyclone and filters. Methods for calculating the gas flow in the test stream and the efficiency of dust-extracting equipment are included.

E. J. Pyrcioch

### Metals in Oils

Barney, J. E. II and Kimball, W. A. DETERMINATION OF IRON IN USED LUBRICATING OILS. . . *Anal. Chem.*, 24, 1548-1550 (1952) October.

A spectrochemical procedure capable of measuring from 0.001 to 0.1% iron in lubricating oil has been developed. By use of a spectroscopic buffer, the method is made relatively independent of the usual amounts of additives containing potassium, barium, calcium, zinc, and/or phosphorus that are used in premium motor oils. The precision of the method is about 10%. The method requires about one-sixth man-hours per sample. D. V. Kniebes

Woodle, R. A. and Chandler, W. B., Jr. MECHANISM OF OCCURRENCE OF METALS IN PETROLEUM DISTILLATES. *Ind. Eng. Chem.*, 44, 2591-2596 (1952) November.

The mechanism whereby vanadium and other metals contained in the parent crude oil enter petroleum distillates was studied. The data support the conclusion that the presence of metals in vacuum distillates is caused by actual volatilization of relatively low molecular-weight metal compounds indigenous to the crude oil. D. V. Kniebes

### Methane Determination

Nash, H., Jr., Hall, J. R., Allgood, H. Y. and Burnett, J. A. CONTINUOUS DETERMINATION OF SMALL PERCENTAGES OF METHANE IN GASES. *Anal. Chem.*, 24, 1650-1954 (1952) October.

This method was developed for analysis of ammonia synthesis gas obtained by catalytic reforming of natural gas. Methane in the gas is burned with oxygen over a catalyst consisting of copper oxide wire mixed with iron oxide impregnated refractory, and the resulting carbon dioxide is recorded by electric conductivity measurement. Pretreatment includes removal of carbon monoxide and part of the carbon dioxide by copper solution, and removal of residual carbon dioxide by potassium hydroxide solution. D. M. Mason

### Nitric Oxides Determination

Johnson, C. L. ANALYSIS OF GAS MIXTURES CONTAINING OXIDES OF NITROGEN. *Anal. Chem.*, 24, 1572-1575 (1952) October.

A chemical method was developed for the analysis of gas mixtures from nitric acid oxidation of organic compounds, which contain nitrogen, hydrogen, carbon monoxide, carbon dioxide, nitrous oxide, nitrogen dioxide, and nitric oxide or oxygen. Total nitric oxide plus nitrogen dioxide is determined by oxidation to nitric acid with hydrogen peroxide and acidimetric titration of the nitric acid. In a second sample the split between nitrogen dioxide and nitric oxide is determined by permanganate titration. Residual gas is analyzed by absorption of carbon dioxide in potassium hydroxide solution, and oxygen in alkaline pyrogallol, combustion of nitrous oxide with added excess hydrogen, and combustion of hydrogen and carbon monoxide with added excess oxygen. Results are believed to be accurate to $\pm$ 1% of total sample.

D. M. Mason

### Standardization

King, J. G. STANDARD METHODS OF COAL ANALYSIS. *Coke and Gas*, **14**, 363-367 (1952) October.

The pre-war studies directed toward standardization of fuel analysis and sampling have been reactivated by the International Organization for Standardization, under Technical Committee 27 (I.S.O./TC 27) on Solid Mineral Fuels. The latest meeting (December, 1951) included delegates from 13 nations. Best agreement had been reached in 1950 on determinations of calorific value and total sulfur, and the committee secretariat (vested in the British Standards Institution of Great Britain) was asked to formulate "draft proposals." After 1951 review, the calorific value method is being drafted as a specification for member approval. On other methods, further discussion, comparison and collaborative work on circulated samples is in progress, and "draft proposals" are to be formulated. These include: total sulfur, volatile matter, carbon, hydrogen, nitrogen, ash, moisture (4 methods), mineral matter correction, phosphorus, chlorine, arsenic, sulfur forms, crucible swelling, Gray-King, and Arnu caking. Consideration will be given later to sampling, coal ash, oxygen, analysis and physical tests of coke, and standard-method of reporting. O. P. Brysch

### Sulfur Determination

Belcher, R. and Ingram, G. AN APPARATUS FOR THE MICRO-DETERMINATION OF SULPHUR AMD HALOGENS IN ORGANIC COMPOUNDS BY THE RAPID COMBUSTION PROCESS. *Analytica Chimica Acta*, **7**, 319-323, (1952) October.

A compact apparatus is described for the determination of sulfur and halogens in organic compounds by a rapid tube-combustion process. Sulfur is finished acidimetrically in the absence of nitrogen; gravimetrically when it is present. Suitable methods for the individual halogens are suggested. D. M. Mason

Elphick, J. O. and Gerson, T. CONDUCTOMETRIC DETERMINATION OF SULPHUR IN COAL. *Fuel* (British), **31**, 438-444 (1952) October.

Conductometric titration of sulfur from coal burned in a bomb calorimeter is described. A measured amount of sulfuric acid is added to the bomb washings to insure not less than five conductivity readings, and the resulting solution titrated conductometrically against Ba $(OH)_2$, after removal of $Fe(OH)_3$ and Al $(OH)_3$. The conductivity readings and plotted against ml. $Ba(OH)_2$. A blank determination which includes the added $H_2SO_4$ is subtracted from the titer derived from the curve. The results are in good agreement with those by the Eschka method using coals ranging in sulfur content from 0.2 to 13.6%. The method is suitable for routine analysis. D. J. Dennison

### Water Vapor

Brickel, W. F. DETERMINATION OF WATER VAPOR IN NATURAL GAS BY DIRECT CHEMICAL METHOD. *Petroleum Eng.*, **24**, D58-D66 (1952) November.

The use of ethylene glycol absorbent with Karl Fischer reagent is proposed for the determination of moisture in natural gas. Equipment is described for use of these materials and experimental results are given showing standard deviations of the order of 4%. It would seem that the method is inherently very accurate and that better results are possible with somewhat different equipment and technique.

R. F. Bukacek

## 8. GENERAL AND PHYSICAL CHEMISTRY

### Combustion Pressures

Warshaw, H. D. A GAUGE FOR INDICATING PRESSURE TRANSIENTS IN A COMBUSTION CHAMBER. *Rev. Sci. Instruments*, **23**, 493-496 (1952) September.

A gauge that is linearly responsive to pressure changes of the order of 400 psi per microsecond with a useful range of 0-16000 psi is described. The gauge is designed for mounting in the wall of a combustion chamber and is small enough for use in the barrel of a caliber 0.50 weapon. A bonded-wire strain gauge in a conventional ballast circuit converts the pressure function into an electrical signal that is displayed on the screen of a cathode-ray oscilloscope. This equipment has been used extensively to measure gun-muzzle pressures.

Author's Abstract

Olsen, H. L., Edmonson, R. B., and Gayhart, E. L. MICROCHRONOMETRIC SCHLIEREN STUDY OF GASEOUS EXPANSION FROM AN ELECTRIC SPARK. *J. Applied Phys.*, 23, 1157-1162 (1952) October.

Gaseous phenomena induced by short-duration sparks at atmospheric pressure have been photographed during the first microseconds of their existence by a flash-schlieren technique. The growth of the heated gas domain (kernel) expanding from the spark discharge has been observed for air and argon. The kernel continues to expand rapidly, but subsonically, after the spark current ceases and after the shock wave separates. It developes further into a torus about the spark electrodes and eventually decays. The development of flame from a heated gas kernel in a flammable mixture is illustrated. Energy relationships for the expanding argon kernel are discussed. Authors' Abstract

## Equilibrium Curves

Habgood, H. W., Weinberger, M. A., and Schneider, W. G. ON THE LIQUID-VAPOR COEXISTENCE CURVE OF XENON IN THE REGION OF THE CRITICAL TEMPERATURE. *Can. J. Chem.*, 30, 815-816, (1952) October.

The width of the flat top of the saturated liquid-vapor density coexistence curve of xenon was calculated using the experimental PV critical isotherm for xenon. The agreement with the experimentally determined curve (*Can. J. Chem.*, 30, 422, 1952) is good. Thus the effect of gravity on density is capable of explaining the whole of the flat-top width of the observed coexistence curve. O. T. Bloomer

## Hydrogen Reactions

Bywater, S. and Roberts, R. TEMPERATURE INDEPENDENT FACTORS OF HYDROGEN ABSTRACTION REACTIONS IN THE GAS PHASE. *Can. J. Chem.*, 30, 773-778 (1952) October.

The "A" factor in Eyring's absolute rate theory for hydrogen abstraction reaction using radical complexes as the abstractor has been calculated and is compared with the experimentally observed value. The calculated value is obtainable from the summation of the various modes of energies by assuming given complex structures and given atomic distances. An error varying over several powers of ten was obtained. This is attributed to error in predicting the internal rotation energies of the methyl radical. S. Mori

## $H_2S$ Dissociation

Sehon, A. H. THE DISSOCIATION ENERGIES OF THE FIRST AND SECOND BOND IN $H_2S$ AND SOME COMMENTS ON A RECENT PAPER BY FRANKLIN AND LUMPKIN. *J. Am. Chem. Soc.*, 74, 4722-4723 (1952) September 20.

Choice of data for the calculation of dissociation energies is discussed. D. M. Mason

## Mass Spectrometry

Kerwin, L. NOTE ON THE RESOLVING POWER OF MASS SPECTROMETERS. *Can. J. Physics*, 30, 503-511 (1952) September.

In calculating the resolving power of a homogeneous field mass spectrometer, one must consider the dispersion and the beam width of the instrument. The latter is the sum of at least 10 components, which are discussed. Formulae giving the resolving power of three types of spectrometer of current interest are developed, as well as formulae for positioning the exit slits. Author's Abstract

## Viscosity Data

Granet, I. and Kass, P. THE VISCOSITY, THERMAL CONDUCTIVITY AND SPECIFIC HEAT OF DRY AIR AT ELEVATED PRESSURES AND TEMPERATURES. *Petroleum Refiner*, 31, 113-114 (1952) October.

Charts are presented for viscosity, thermal conductivity, and specific heat of air for the temperature range 100 to 1,500° F. and pressure range 14.7 to 2,000 psia. New experimental data are not presented, but the charts are based on the data and correlations of previous investigators; a bibliography is included. W. W. Clauson

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Emmerson, R. J. ELECTRICITY FROM A GAS FLAME. p. 4

Huggins, R. A. MEASUREMENT OF TRANCIENT SURFACE TEMPERATURES. p. 15

## 9. ORGANIC CHEMISTRY

### Cyclic Sulfides

Brown, R. H. and Meyerson, S. CYCLIC SULFIDES IN A PETROLEUM DISTILLATE. *Ind. Eng. Chem.*, **44**, 2620-2641 (1952) November.

Saturated cyclic sulfides were found in petroleum distillates having unpleasant odor even after mercaptan removal. Physical and chemical properties of the concentrate containing these sulfur compounds, together with data from the mass-spectrometric analysis of the concentrate before and after desulfurization are tabulated. C. E. Hummel

### Ethylene Glycol

ETHYLENE GLYCOL PLANT FEATURES UNIQUE SEPARATION METHOD. *Can. Chem. Processing*, **36**, 34-36 (1952) November.

The article describes generally, along with a flow diagram, the operation of the Dominion Tar and Chemical Company's ethylene glycol plant. The unique ethylene separation unit performs by means of a system of expansion and heat exchange without any requirements for external refrigeration. W. J. Pleticka

### Urea Synthesis

Bland, W. F. NEW UREA SYNTHESIS PROCESS. *Petroleum Processing*, **7**, 1457-1461 (1952) October.

A description of the "Inventa" process for the production of urea is given. Important features are complete recycle of unconverted feed stocks, use of new corrosion-resistant alloys, improvements in crystallization techniques and improved steam economy. W. J. Pleticka

## 10. CHEMICAL ENGINEERING

### Fire Protection

Tryon, G. H. PREPLAN YOUR FIRE PROTECTION. *Construction*, **34**, 101-110 (1952) October.

The article stresses the fire hazard existing in partially completed buildings under construction where fire prevention systems have not yet been installed. Generally new constructions do not have proper water installations and are subjected to the hazard of temporary wooden forms, tarpaulins, and open fires used in the building. Annual losses from this type of fire have been high. W. G. Bair

### Fluid Flow

Norman, W. S. A GRAPHICAL METHOD FOR COMPUTING THE FLOW OF COMPRESSIBLE FLUIDS IN PIPES. *Chem. Eng. Science*, (British) **1**, 194-196 (1952) July.

A graphical method is presented for computing the flow of compressible fluids in pipes for the steady state case in which the fluid is ideal. The method is applicable to both the isothermal and adiabatic cases. The graphical solution is developed in terms of three dimensionless ratio's: $(P_1 - P_2)/P_1$, the friction factor, and the initial Mach number. O. T. Bloomer

### Fluidized Reactor

Loon, W. (assigned to De Directie van de Staatsmijnen, Netherlands) GAS-SOLID CONTACT REACTOR. U. S. 2,613,138 (1952) October 7.

A modification of the fluidized bed method of solid-gas mixing is described whereby one or more reactor chambers are superimposed and so designed that the gases flow counter to the solids dropping from the higher to the lower chamber by gravity, and come into contact with the latter at an angle from the true vertical position thereby increasing the contact concentration of the solid in the gas in the system prior to the entry of the gas into the higher reactor zone. S. Mori

Peet, N. P. (assigned to Standard Oil Development Co.) VESSEL FOR FLUID CATALYST REACTION WITH MEANS FOR VARYING HEIGHT OF THE DENSE PHASE. U. S. 2,615,796 (1952) October 28.

A vessel is designed for fluid catalytic cracking in which the provision is made for varying the reaction bed depth. An annular space between reaction zone and vessel shell is used as a stripping reaction. The pressure difference between this stripping zone and reaction zone can be varied by means of a throttling valve on the stripper outlet. This in turn controls the bed depth in the reaction zone. W. G. Bair

### Spray Analysis

Hughes, R. R. and Gilliland, E. R. THE MECHANICS OF DROPS. *Chem. Eng. Progress*, **48**, 497-504 (1952) October.

A literature review of the mechanics of drops is presented. The material includes the gross

motion of drops and the detailed motion in and around individual drops. The author discusses the effect of forces of acceleration, viscosity, internal circulation due to skin friction, and fluid motion on the drop shape and movement. A sample calculation is presented to show use of the material in design. R. E. Peck

York, J. L. and Stubbs, H. E. PHOTOGRAPHIC ANALYSIS OF SPRAYS. *Trans. Am. Soc. Mech. Engrs.*, 74, 1157-1162 (1952) October: ASME Paper No. 51-A-48.

This article explains a photographic method of measuring size distribution and the velocity of drops in a spray system. The size of the particles is measured on the pictures. The velocity is determined by the length of path (on the film) between two exposures, and the position is determined by the area which is in focus on the picture. The pattern of the spray is not disturbed by this technique. Measured flow of drops gave values which check within 20% from the metered values of total flow rate. R. E. Peck

# 11. PROCESS EQUIPMENT AND INSTRUMENTATION

## High Vacuum Equipment

Gerow, G. P. HIGH VACUUM EQUIPMENT. *Chem. Eng. Costs Quarterly*, 2, 80-89 (1952) November.

Methods of selecting a high vacuum system for a given job are discussed, and cost data for component parts of vacuum systems is presented. D. V. Kniebes

Lawrence, R. B. HIGH-VACUUM VAPOR PUMPS. *Chem. Eng. Progress*, 48, 537-548 (1952) November.

A new graphical presentation of the characteristics of high-vacuum vapor pumps is described. Much information about a pump can be condensed onto a single easily-read graph of this type. D. V. Kniebes

## $H_2S$ Handling

Bice, W. O., Prange, F. and Weiss, R. E. HANDLING LIQUID HYDROGEN SULFIDE. *Ind. Eng. Chem.*, 44, 2497-2500 (1952) October.

Safety features and corrosion experience of a plant producing mercaptans from hydrogen sulfide and olefins are discussed. D. M. Mason

## Orifice Meters

Chio, H. S. DETERMINATION OF ORIFICE METER COEFFICIENTS. *Petroleum Eng.*, 24, C5-C22 (1952) October.

Derivation of basic theoretical equations, the equations for liquid measurements and gas measurements are given in detail. D. C. Gami

Griffin, W. A. ORIFICE METER RUNS. *Instruments*, 25, 1441-1443 (1952) October.

Topics treated include fabrication and inspection of meter runs. Subtopics are selection of pipe, condition of the pipe wall, roundness, welding, alignment and, finally, use of honed meter tubes. Out-of-roundness tolerances are tabulated. The use of a jig to line up an orifice flange with pipe and allow full fusion without icicles or distortion is explained. Honed meter tubes are recommended, but it is pointed out that higher measurements are obtained than from runs with conventional pipe for some unexplained reason. J. D. Parent

## Transient Pyrometry

Huggins, R. A., Roll, I. B., Udin, H. MEASUREMENT OF TRANSIENT SURFACE TEMPERATURES. *Rev. Sci. Instruments*, 23, 467-470 (1952) September.

Temperature-time cycles for rapidly changing temperature conditions such as found on or near a spot weld cannot be followed by thermocouples due to their time lag. However, by using a lead sulfide photoelectric cell, an amplifier, a Wheatstone bridge and an oscilloscope, sensitivity of the order of 0.01 millisecond can now be obtained. This instrument has been developed in conjunction with the study of the formation of the various phases of iron oxides and carbides. Shiro Mori

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Segesman, F. F. ELECTRONICS IN GEOPHYSICAL INSTRUMENTATION. p. 7

Warshaw, H. D. GAGE FOR INDICATING PRESSURE TRANSIENTS. p. 12

# 12. MATERIALS OF CONSTRUCTION

## Carbon Refractory

Heyroth, A. H. (assigned to The Carborundum Co.) REFRACTORY ARTICLES AND METHOD OF MAKING. U. S. 2,614,947 (1952) October 21.

A dense carbon body is formed by carbon precipitation from a furfural compound by a mineral acid (80:20 volume ratio) with or without addition of carbon fillers, and after molding and calcination, the body is surface-hardened by exposure to silicon vapors at above 1800° C., to form an integral layer of silicon carbide of cubic structure. O. P. Brysch

## Cathodic Protection

Hunter, J. N., Jr. MAGNESIUM-ANODE PROGRAM. *Oil Gas J.*, 51, 284-288 (1952) October 13.

A program of corrosion control by magnesium anodes is outlined. Included in the article are design and installation practices, and graphs to be used in this connection. R. A. Brown

Sonntag, C. E., Jr. MAGNESIUM ANODE SYSTEM RESURVEYED AFTER 2-1/2 YEARS. *Oil Gas J.*, 51, 303-314, 332 (1952) October 13.

This protection system survey consisted of checking on the segregation of protected from unprotected installations and on pipe-to-soil potentials over the entire length of the line and measurements of current outputs at the anode stations. Results of the survey and recommendations for future construction programs are included. R. A. Brown

Werkin, L. C. CATHODIC PROTECTION LICKS CORROSION. *Petroleum Refiner*, 31, 122-124 (1952) October.

The value of cathodic protection against corrosion resulting in reduction of over-design of equipment, product losses and maintenance and depreciation costs is stressed. R. A. Brown

## Corrosion Cracking

Vollmer, L. W. HYDROGEN SULPHIDE CORROSION CRACKING OF STEEL. *Corrosion*, 8, 326-332 (1952) October.

Sudden blow-out of tubing after only six days of production tests of the 12,000-foot Walter Marr Well No. 1, Pincher Creek Field, Canada caused an investigation of causes for failure. Examination of the removed 9 percent nickel-steel tubing showed no obvious defects and calculations showed failures not due to excessive triaxial loading. Numerous tests of the tubing and other steels, including pre-stressed samples were conducted at varying loading in tap water containing hydrogen sulfide and carbon dioxide. These tests developed the following tentative conclusions: 1) Tubing failures at the Marr well resulted from stress-corrosion cracking. 2) Susceptibility to failure in hydrogen sulfide environments is not limited to 9 percent nickel steel. Steels treated to produce Rockwell C24 to 26 may be rendered susceptible. 3) Plastic deformation greatly increases susceptibility to failure, but is not essential if protective corrosion products films are removed. 4) Embrittlement is not a primary cause of failure but may be contributory. 5) Susceptibility may be reduced by composition changes.

Author's Abstract

## Plastic Pipe

Fugazzi, J. F. PLASTIC TUBING USE FOUND PRACTICAL AT PUBLIC SERVICE CO. OF COLORADO. *Gas*, 28, 49-52 (1952) October.

Investigations of plastic tubing for use in underground gas service piping included capacity tests, expansion tests, tests with manufactured coal gas and tests of the effects of sub-freezing temperatures as well as procedures for plastic-to-steel connections. Installed on 1951, 28,000 feet of Tenite II plastic tubing have proven trouble-free. R. A. Brown

## Super-Refractories

METAL OXIDE REFRACTORIES. *Ceramics* (British), 4, 105-112 (1952) October.

A review is given of the known metal oxide refractories suitable for temperature service above 1700 degrees C. Physical and thermal property data and some cost data are listed. Additional information such as application and manufacturing methods is given on alumina ($Al_2O_3$), beryllia (BeO), zirconia ($ZrO_2$), zircon ($ZrO_2 \cdot SiO_2$), magnesia (MgO), and on thoria ($ThO_2$) which has the highest melting point of the refractory oxides (approx. 3,000 degrees C.) E. J. Pyrcioch

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